Studies on the Adhesion of Polyvinyl Acetal

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31. Studies on the Adhesion of Polyvinyl Acetal

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Some samples of polyvinyl acetacetal were synthesized, using 5 kinds of polyvinyl alcohol having various degrees of polymerization as raw materials (Table 1).

Table 1. Samples of acetal used as adhesive

No. of samples	Degree of polymerization of polyvinyl alcohol used as raw material	Degree of acetalization (%)
1	1260	51.2
2	1070	57.6
3	712	52.9
4	426	53.8
5[a)]	193	63.7

a) No. 5 could not be used, because the amount was too little and the viscosity of the solution was too low to prepare the test piece under the same condition.

Methanol solution (10% conc.) of these acetals were used to glue rayon cloth on glass surface. These test pieces were dried for 2 days, 15 days and one month in a desiccator which contained calcium chloride, at room temperature. Then the adhesive force was measured by stripping method using a testing machine which was designed by us.

Linear relation was gained between logarithmus of both the strip angle and the strip load in all cases. The tentative measure of adhesive force P_{10}, the strip load at the strip angle of 10°, which was gained by the extrapolation of these straight lines, are shown in Table 2.

Table 2. The relation between the degree of polymerization, drying condition and the adhesive force (P_{10}). (unit in kg.)

Drying condition \ No. of samples	1	2	3	4
2 days at room temp.	2.6	3.4	4.0	3.6
15 days ,,	3.4	3.8	4.2	6.4
1 month ,,	2.9	3.5	5.5	8.3

The lower the degree of polymerization, the higher the adhesive force and the more remarkable the increase of the adhesive force with the duration of drying.